March - May 2013 :
Forecast of Opportunity for East African Long Rains?

Considerations:

- Sustained drying trend has occurred over past 30 years
- Emerging evidence for an SST forcing of the drying trend
- SSTs responsible for drying may be Pacific zonal-gradient increase
- Forecast MAM 2013 SSTs resemble the SSTs associated with drying trend

Proposed Outlook:

- **An Increased Probability that East African MAM 2013 Rains Will Be Below the Average of the 1981-2000 Wet Epoch.**

- **East African MAM 2013 More Likely to Resemble the Average of the 2001-2012 Dry Epoch.**

Considerations for 2013 East African Long Rains

° Indications that March-May Long Rains of East Africa Are Sensitive to SSTs

° Climate models Reveal SST Pattern to which East Africa Long Rains Respond

° Expected MAM 2013 SST Resemble this SST Sensitivity Pattern

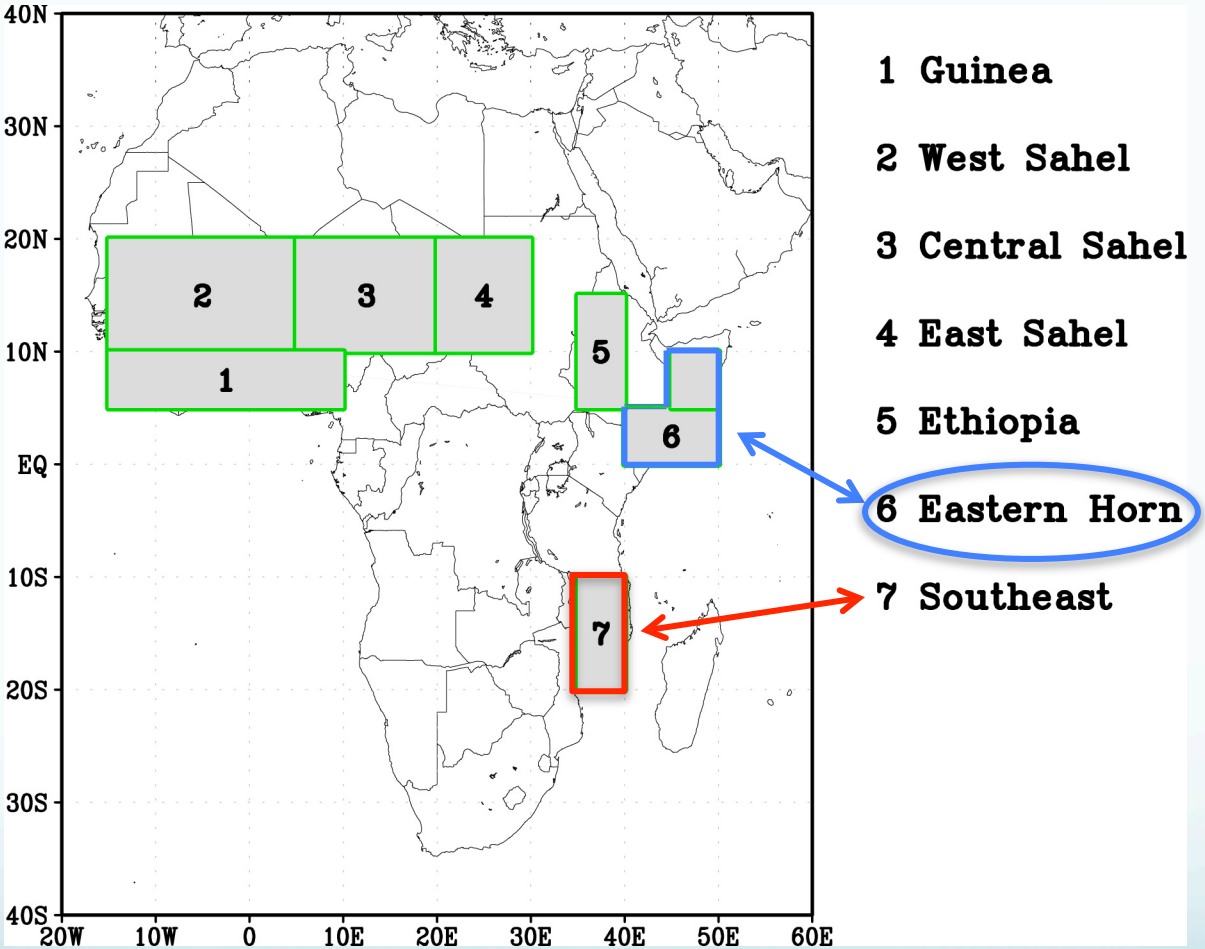
° Portend for East African Dryness during MAM 2013

Martin Hoerling and Brant Liebmann

NOAA and University of Colorado-CIRES

Two Key Wet Seasons are of Particular Interest

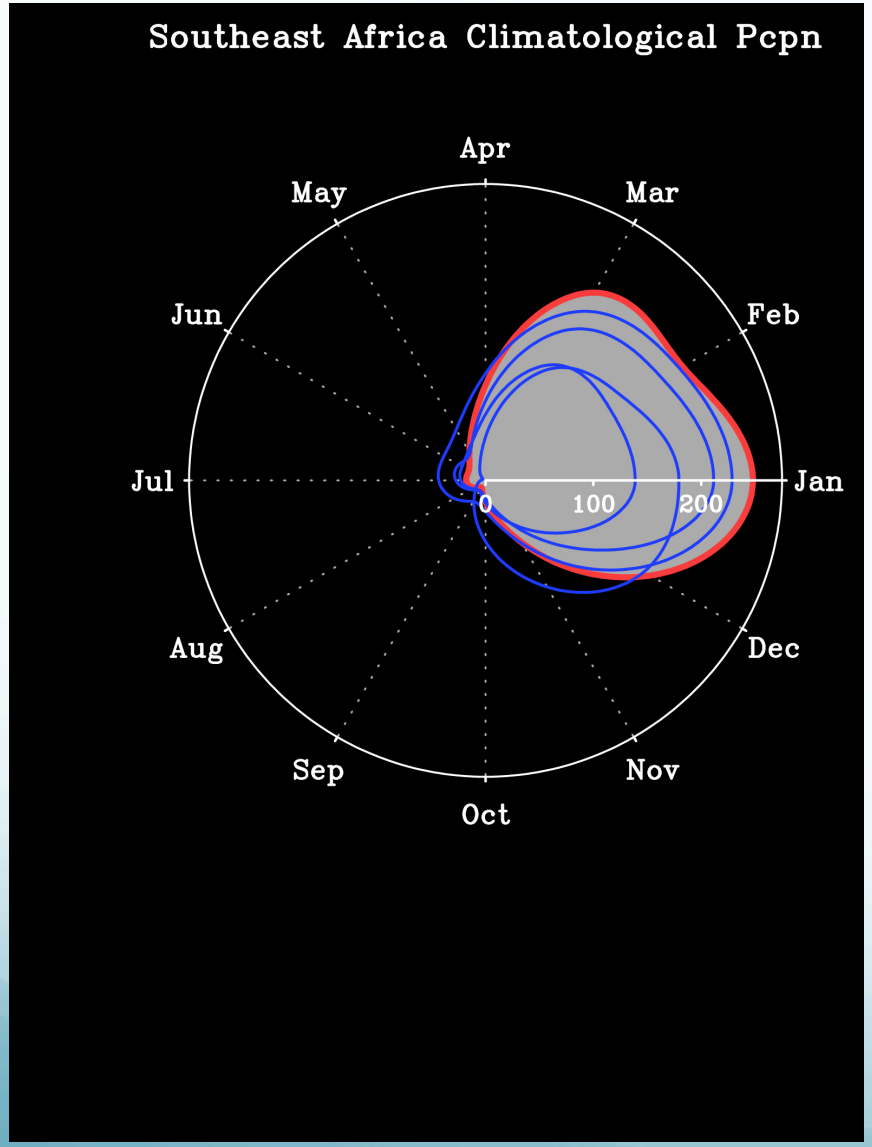
SE Africa *(DJFM; Area 7)* **& Eastern Horn** (*MAM; Area 6*)

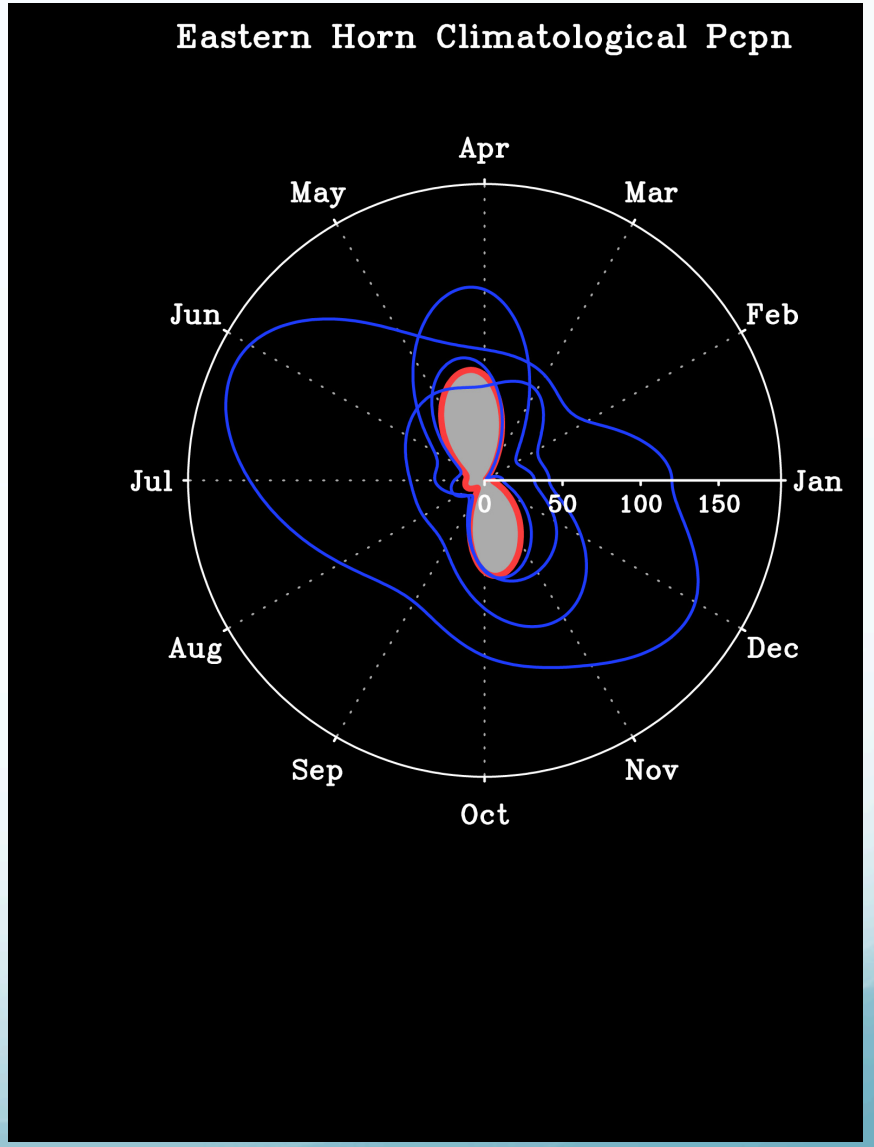


Two Key Wet Seasons: SE Africa *(DJFM)* **& Eastern Horn** (*MAM*)

Climatological Seasonal Cycle of Pcpn

Observed (red curve w/grey shade) and various GCMs (blue curves)

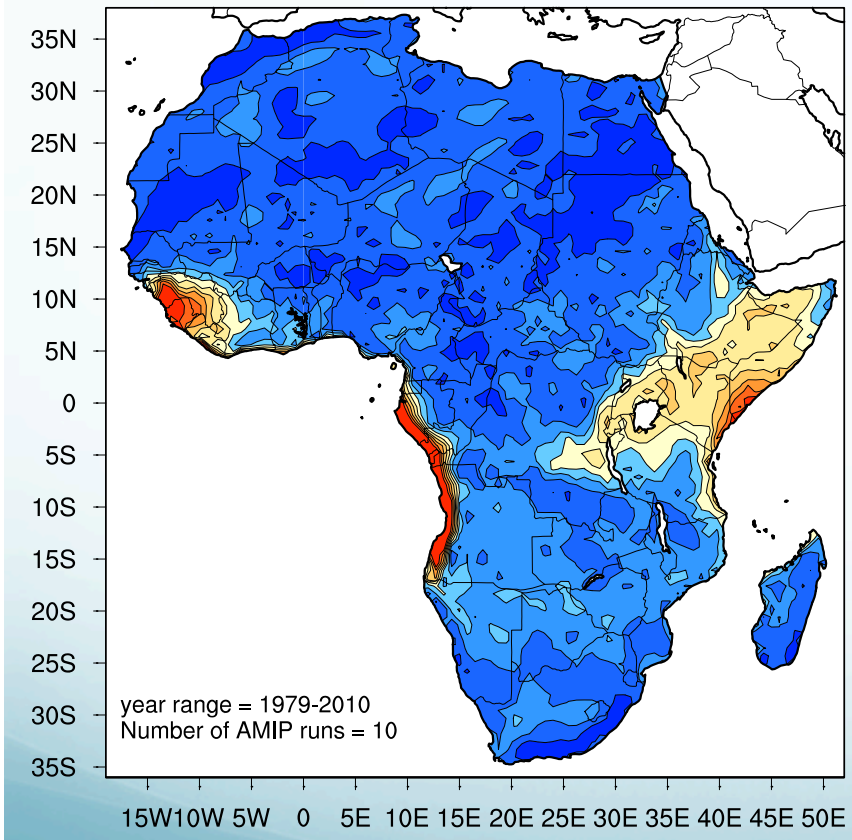


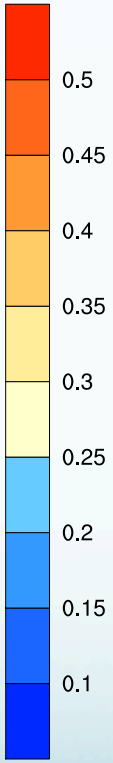


Climate Models Indicate that Eastern Africa Long Rain Season *is Sensitive to SST Variability*

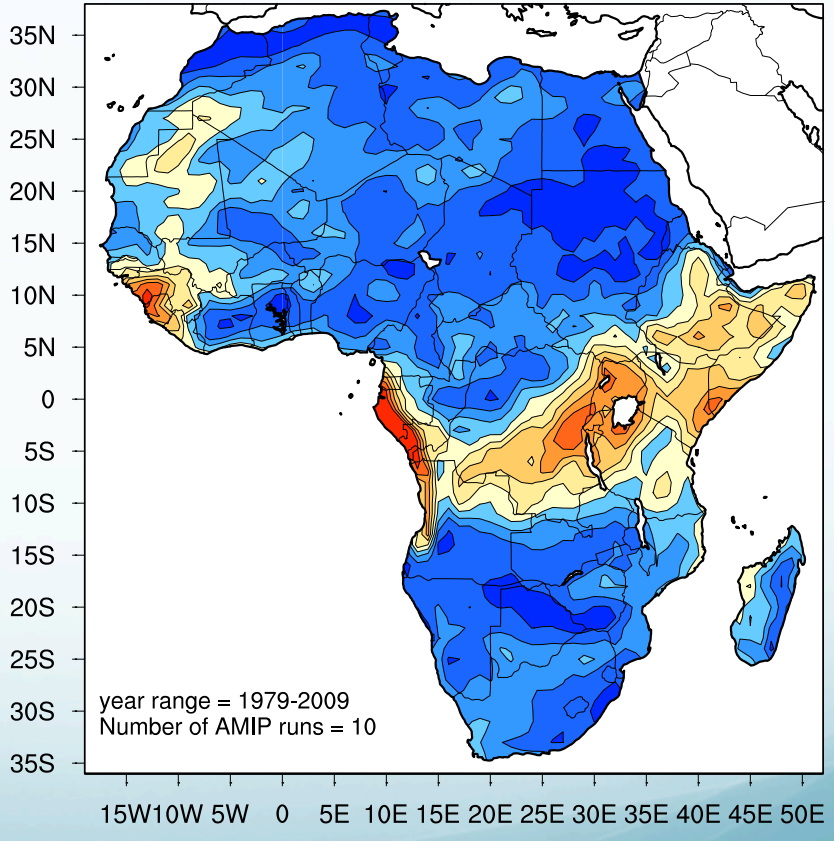
Ratio of Variances: March - May

ECHAM 5



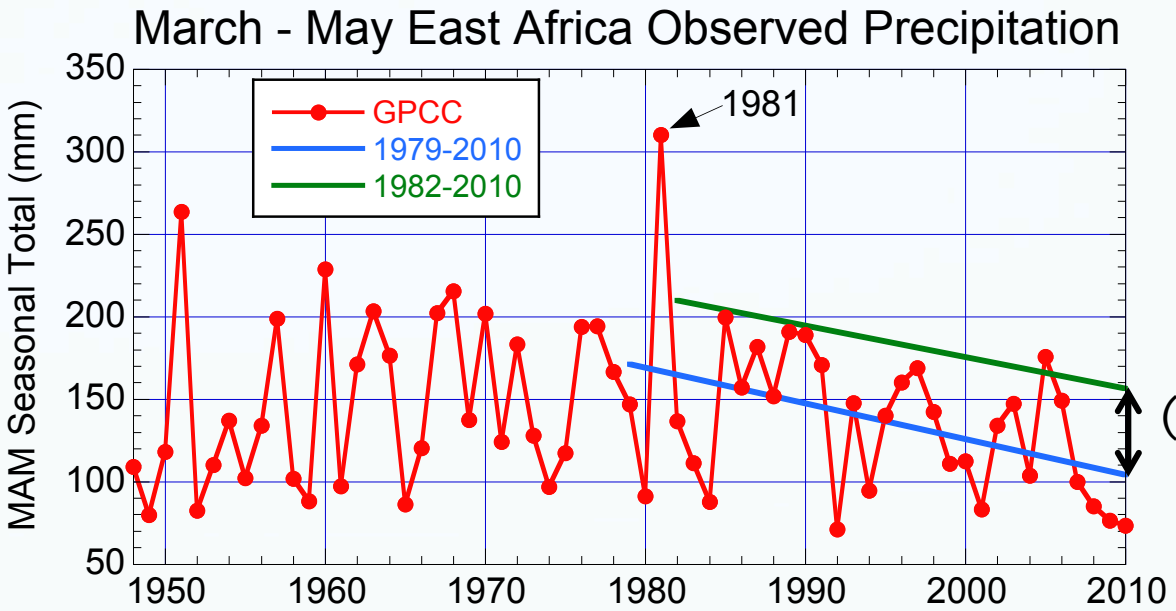


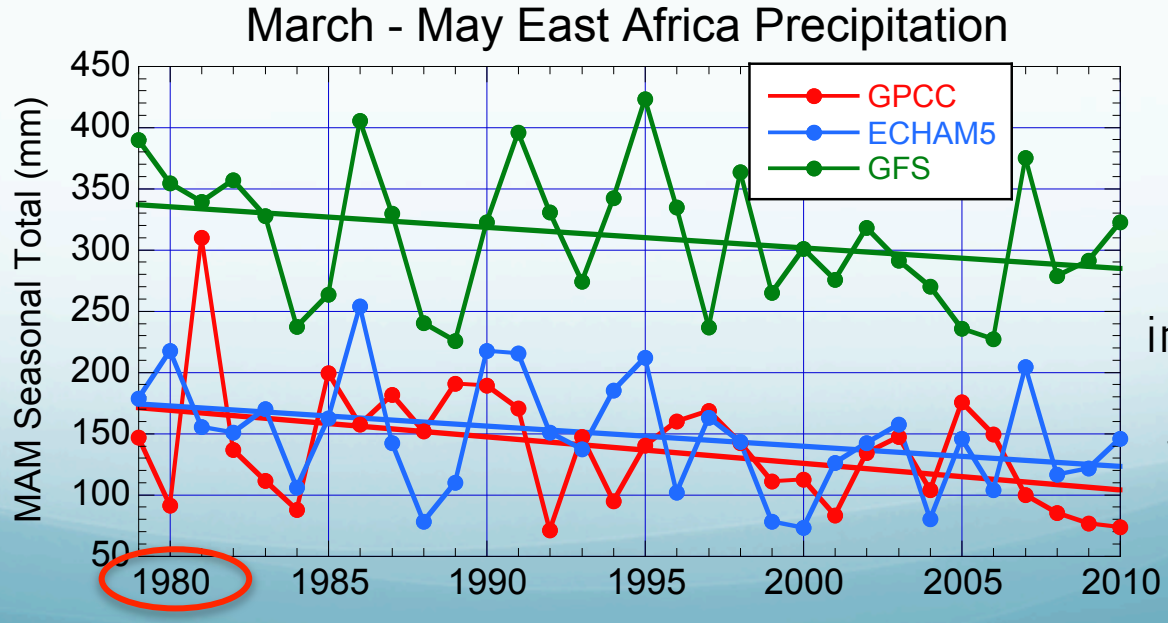
GFS–v2



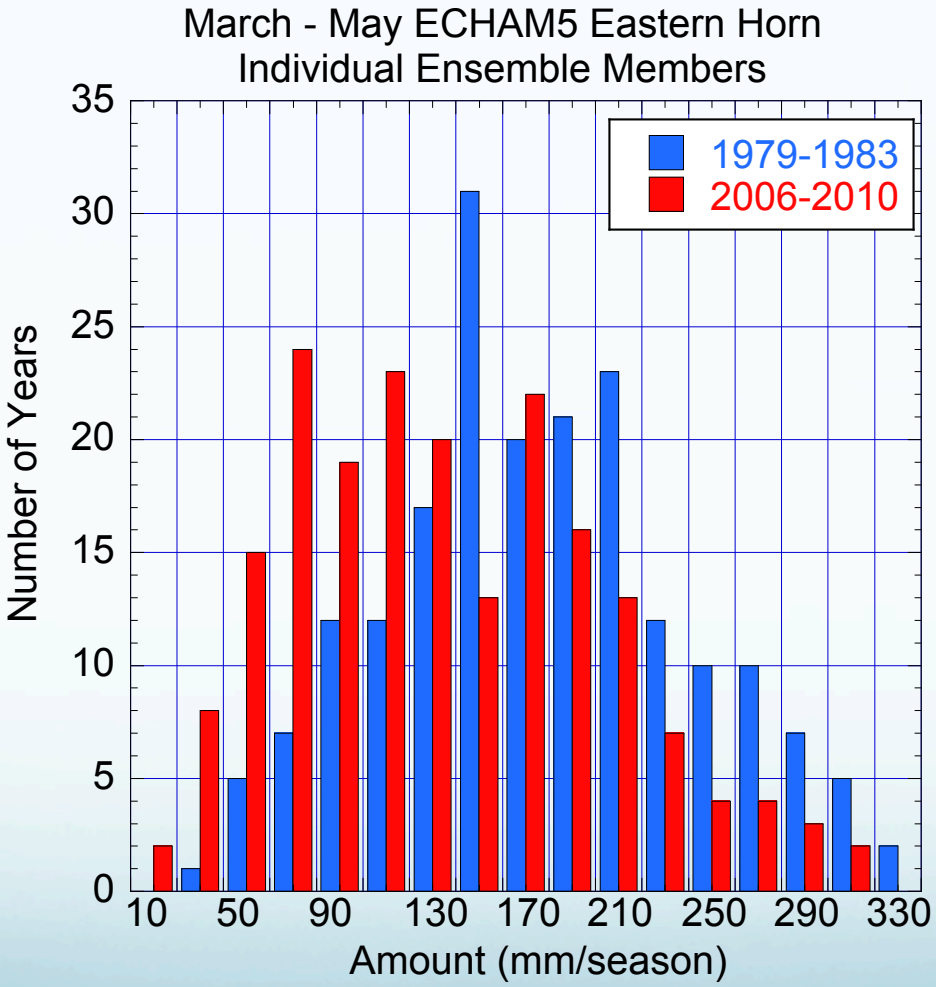
There has been a downward trend in March – May East African Rainfall since 1979

The downward trend is observed even if the wet year of 1981 is excluded





The trend is evident in AMIP models forced with observed SST


March - May ECHAM5 Eastern Horn
Individual Ensemble Members
1979-1983
2006-2010
Number of Years
0
5
10
15
20
25
30
35
10
50
90
130
170
210
250
290
330
Amount (mm/season)

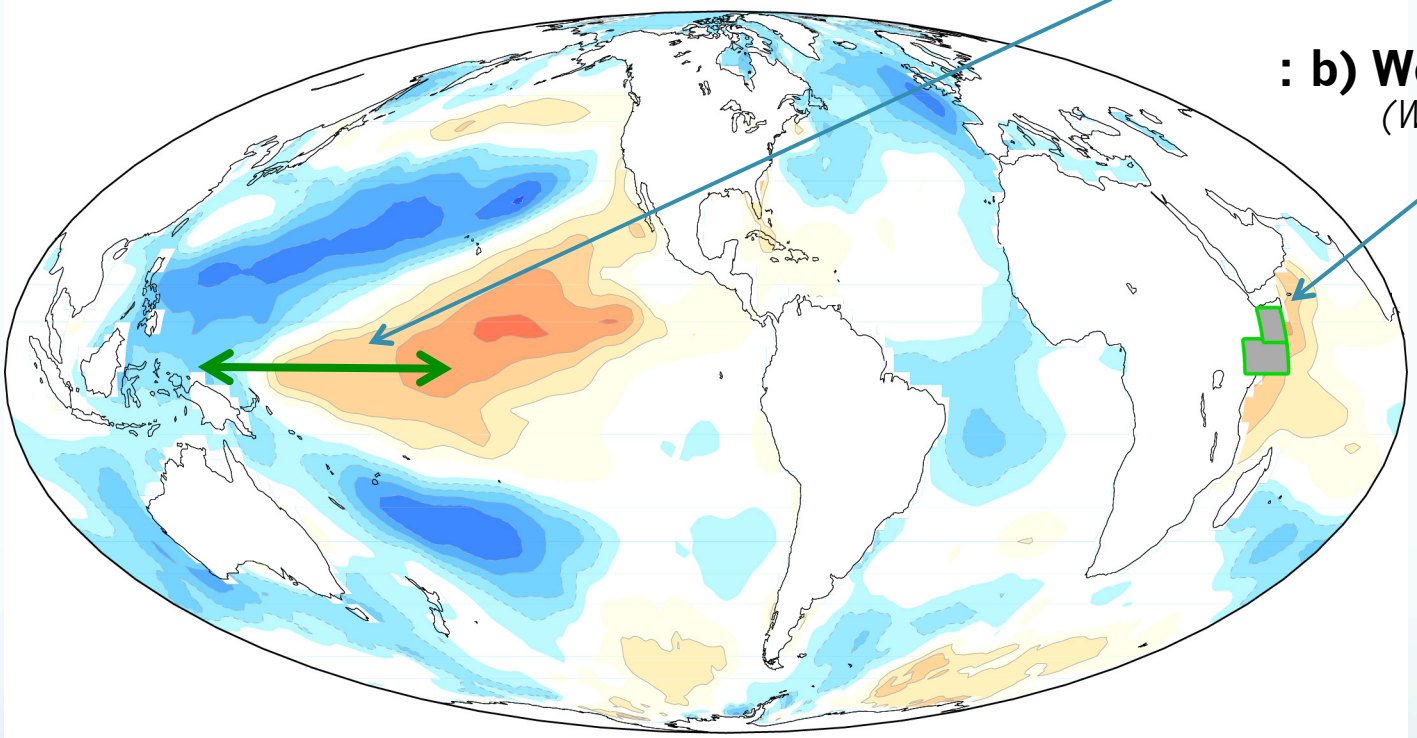
Correlation of Observed SST and
East Horn GFSv2 Rainfall: March–May

Climate Model Long Rains Sensitive to : a) Zonal Gradient in Pacific SST

(Increased Gradient = Dry)

: b) West IO SST

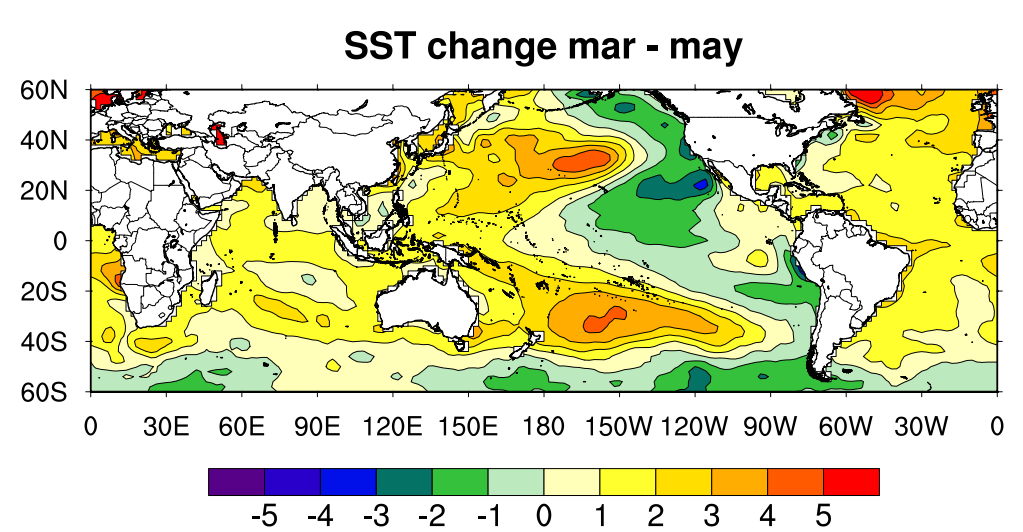
(Warm = Wet)



Correlation Coefficient

−0.8 −0.7 −0.6 −0.5 −0.4 −0.3 −0.2 −0.1 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8

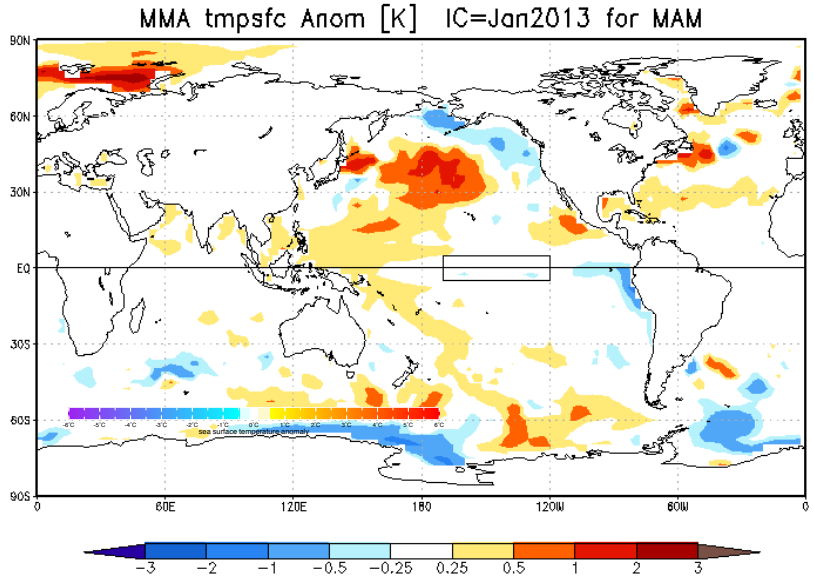
This the MAM Change in Sea Surface Temperature for 1979-2011



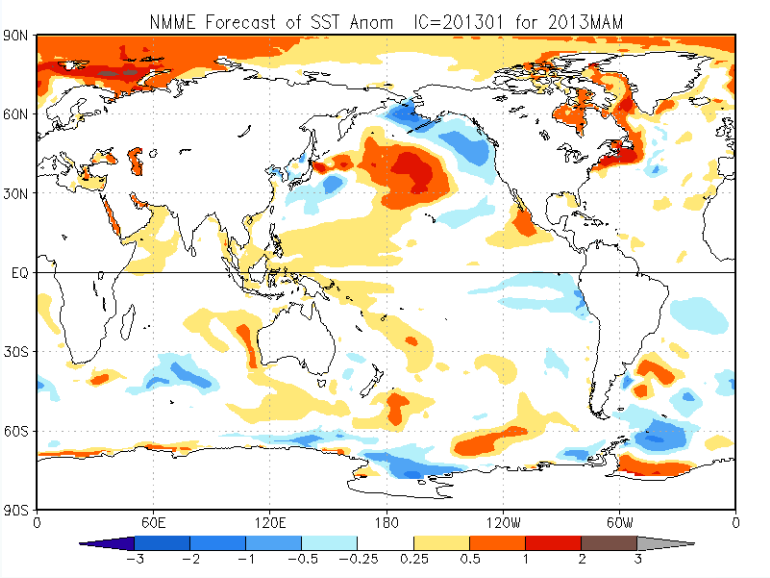
Current SST Forecasts for MAM 2013

Forecast Pattern Resembles Recent Trend and Sensitive Pattern

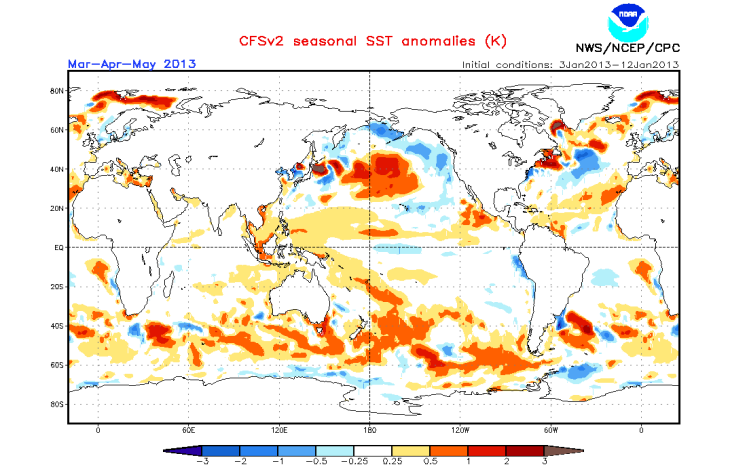
Early January Predictions



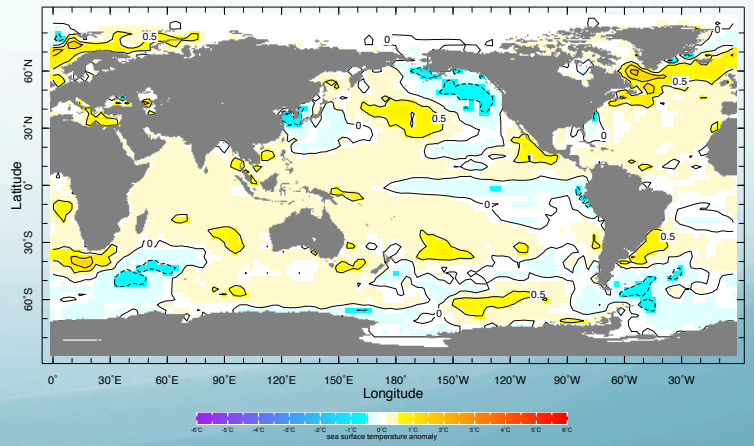
International Multi-Model Ensemble (IMME)



National Multi-Model Ensemble (NMME)



NCEP CFS



IRI

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